

# Anxiety and depression in Parkinson's disease

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# **Knowledge Valorisation**

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‘Valorisation is the process of creating value from knowledge, by making this knowledge available and suitable for economic and social exploitation and to translate this knowledge into products, services, processes and new business.’ (1). With other words, it is a way in which one can express the importance of research by translating it into social, economic and financial value.

### **Economic and financial valorisation of this thesis**

According to the Dutch Ministry of Health, Wellbeing and Sports, approximately 29000 patients suffered from parkinsonism, mostly Parkinson’s disease, in 2011 (2). This was based on registration by general practitioners, but it is estimated that the true prevalence is 2-2.5 times higher (3). In the next decades the median age of the population will rise, the number of PD patients will further increase and as such its burden on health care services and costs (2). In the Netherlands, health care costs in 2011 for patients with parkinsonism was estimated to be 267 million euro. This encompasses 0.3% of Dutch total health care costs and 5.1% of health care costs related to diseases of the central nervous system (4). The progressive and long-term nature of PD puts a substantial financial burden on patients, spouses and healthcare providers. Next to direct costs such as drug costs, in- and outpatients care costs and ancillary treatment, indirect costs also impacts financial burden (5). The latter includes costs due to lost productivity and early retirement. In general, disease severity, motor impairment and motor complications appear to have a higher impact on illness costs than non-motor symptoms (NMS) (6). However, impairment of patients’ quality of life (QoL) leads to elevation of both direct and indirect costs (7). This thesis aids in our understanding of both anxiety and depression, which are both known to have a high impact on QoL of PD patients (8, 9). It may be expected that by increasing awareness and recognition with subsequently proper treatment, total healthcare costs will eventually decrease.

### **Social valorization of this thesis**

Health related quality of life (HRQoL) is “the perception and evaluation by patients themselves of the impact caused on their life by the disease and its consequences”, and is crucial in defining his/her wellbeing (10). It is well known that PD has a high impact on quality of life (11). HRQoL is not only affected by motor symptoms, but there is increasing evidence that the occurrence of various non-motor symptoms (NMS) also play an important role in HRQoL perception of PD patients (12, 13). In addition, a recent study showed that despite having progressive motor impairment, non-motor symptoms provided a better prediction of the change of HRQoL over time than motor symptoms (14). Among the NMS with the highest impact on HRQoL are depression, anxiety, urinary disturbances, pain, fatigue and sleep problems (15-17). Especially depression is one of the most significant determinants of HRQoL, although some found that anxiety is even more so (8, 9). Next to the effect of anxiety and depression on the

patient themselves, it also has a high impact on caregivers. They experience distress and problems on physical, mental and socioeconomic aspects of their lives (18). For example, a PD patients' depression seems to be strongly correlated with the presence of depressive symptoms in the caregiver (19). Emotional strain of caregivers even contributes to mortality (20) and in PD it leads to higher patient institutionalization with subsequently higher health care costs (21). Especially neuropsychiatric symptoms, such as anxiety and depression, are identified as predictors of caregiver burden (18, 22-24). Increasing the awareness of the high prevalence of anxiety in PD (Chapter 2) and trying to identify markers (Chapter 3) hopefully lead to earlier treatment. In addition, incorporating new diagnostic and monitoring tools (Chapter 6), improving rating scales of depression (Chapter 4) and informing depressed PD patients about the expected treatment response (Chapter 5) will likely improve identification and treatment compliance. Improved recognition, reporting and management of anxiety and depression positively affect the HRQoL of patients with PD and their caregivers.

### **Products and processes**

The application we studied in chapter 6, the Experience Sampling Method seems to be a viable and useful method to study influences of motor symptoms, affective states and contextual factors in PD patients. The ESM software is freeware and can be downloaded for free as an app on smartphones or iPods. By implementing this method in daily practice, it enables the recognition of highly individual patterns and aids in unraveling intra-individual relations between motor and non-motor symptoms. These person-specific patterns may be fed back to the subject to enhance insight into factors associated with symptom severity and even more importantly facilitate self-management. Behavioral insight may enhance feelings of mastery over the symptoms and facilitate coping or adjustment of activities. Second, ESM can be used to monitor the treatment progress and drug side effects, revealing relatively small treatment effects by avoiding clouding due to recall bias when using retrospective self-report measures. Last, ESM captures subjective experiences of PD patients, which can differ from more objective tools like the UPDRS scale. However, self-reports may be a more useful source of data when dealing with immediate experiences such as affective states. In addition, combining ESM with an accelerometer will give both objective and subjective measures, providing an extensive overview of symptom patterns on an individual base. As mentioned in the discussion (Chapter 7), this is needed for optimizing treatment strategies in a heterogeneous illness such as PD.

### **Conclusion**

This thesis can help neurologists, psychiatrists, psychologists, general practitioners and PD patients and their spouses in their understanding of anxiety and depression in PD. Highlighting the high prevalence of anxiety in PD hopefully increase its awareness. The

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markers identified in our model can aid in recognizing anxiety and specialists should search for clinically relevant anxiety in depressed PD patients. With testing depression rating scales and studying treatment responses in depressed PD patients we hopefully help to optimize recognition and treatment compliance. Treatment strategies must focus on individual patients and ESM seem to be a feasible tool to monitor and study PD symptoms and treatment responses. When this is accomplished, HRQoL of PD patients and their spouses will increase and health related costs will likely decline.

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